Alanya Alaaddin Keykubat University | Rafet Kayış Faculty of Engineering Genetic and Bioengineering Department 2024-2025 Spring Semester

Syllabus	
Code/Name	GBM 302L / GENETIC ENGINEERING II LAB
Туре	Required
Credit/ECTS	3/3
Hour per Week	4
Level/Year	Undergraduate/3
Semester	Spring
Classroom	FFF L114
Content	This course will examine students in genetic engineering laboratory techniques with an emphasis on protein expression and purification. Students will demonstrate the ability to prepare chemical solutions and media, apply sterilization methods to maintain a controlled laboratory environment. They will perform <i>E. coli</i> transformation and protein expression, followed by protein isolation using appropriate techniques. Within the scope of the course, determination of protein concentration and activity, SDS-PAGE and native gel electrophoresis for protein analysis will be discussed. Students will also examine Western blotting techniques to detect specific proteins and chromatographic methods for protein purification. Additionally, students will analyze protein purity by SDS-PAGE and perform enzyme isolation and activity determination using spectrophotometric methods.
Prerequisites	GBM 305L GENETIC ENGINEERING I LAB, GBM 305 GENETIC ENGINEERING I
Textbooks	Primary Laboratory textbook prepared by the faculty members of our department Supplementary Research article published in such libraries as PUBMED, ELSEVIER
Objectives	 To demonstrate proficiency in genetic engineering laboratory techniques and adherence to safety protocols. To apply correct methods in the preparation of solutions and media for protein expression. To apply transformation processes and protein expression in <i>E. coli</i> To perform proteins to isolate and determine their concentrations using appropriate techniques. To perform SDS-PAGE, native gel electrophoresis, and Western blotting for protein analysis. To apply chromatographic methods for protein purification and assess protein purity.
Course Outcomes	 In this course students should be able to: C01. Operate and manage a genetic engineering laboratory, following established procedures for protein expression and purification. C02. Prepare and calculate chemical solutions for protein expression and purification accurately. C03. Perform and evaluate media preparation, protein isolation, and sterilization under laboratory conditions. C04. Perform and analyze experiments related to protein expression, protein isolation, SDS-PAGE, Western blotting, and chromatographic purification techniques. C05. Identify and analyze issues that arise during protein expression, isolation, and purification experiments.

Weekly Schedule of Topics							
W	Торіс	Laboratory Experiments Discussions					
1		Introduction to Genetic Engineering Lab Techniques, organizing study groups, General Information					
2		Preparation of Solutions					

Alanya Alaaddin Keykubat University | Rafet Kayış Faculty of Engineering **Genetic and Bioengineering Department** 2024-2025 Spring Semester

3		Preparation of Medium for Protein Expression										
4	<i>E. coli</i> Transformation and Protein Expression											
5	Induction Protein Isolation Techniques											
6	Concentration of Protein Extracts											
7		Determination of Protein Concentration										
8	SDS-PAGE Gel Electrophoresis											
9	Native Gel Electrophoresis											
10	Western Blotting											
11	1 Chromatographic Methods for Protein Purification											
12	2 Chromatographic Methods for Protein Purification and Purity Analysis by SDS-PAGE											
13	13 Enzyme Isolation and Activity Determination by											
14	Spectrophotometric Methods 14 General Review and Discussion											
Professional Be able to conduct experiments with analyzing data and comparing the results obtained												
Contribution from experiment with literature, and to write weekly report with group member												
Contribution to Program Outcomes*												
	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	
C01	0	0	0	0	5	4	2	0	0	0	0	
CO2	3	4	0	3	5	5	5	0	2	0	0	
CO3	3	3	0	4	5	4	5	4	3	0	0	
C04	2	3	0	4	5	5	5	4	3	0	0	
C05	3	3	0	3	5	3	4	3	5	0	0	
* Contri	bution Le	vel 0: No	one 1: Ve	ry Low 2	2: Low 3	: Medium	1 4: High	5: Very	High			
Special	Conditio	ns Stuc Exp	lents wor erimental	k in group studies a	os. re report	ed using l	MS Word	or PDF fo	rmat.			
Require	ements	F				0						
Course	Policy	Stud	ents must	arrive in	the class	or labora	tory on ti	me.				
	-	Both	Both students and the lecturer must communicate in English.									
		Stud	Students should prepare by reading lab notes and assigned articles prior to the lab									
		sessi	ion each v	veek.								
		At le	ast 80% a	ttendance	e is requi	red; other	wise, a gr	ade of DZ	will be a	ssigned.		
Cheatin	g &	Сору	ving or le	tting som	eone cop	y anyone	e work on	exams, a	assignme	nts, or re	ports is	
Plagiar	ISM	chea	cheating.									
Lutting and pasting text, figures and f								web sour	ces, chan		ly other	
		The	conseque	nce of aca	demic dis	honestv i	is to receiv	ve a grade	of FF for	the cour	se	
Evaluat	ion	The	evaluatio	n breakdo	wn is as	follows:		ve u gruud		the court	50.	
		Labo	oratory R	eports (1	4 pieces) - 30%						
		Thro	oughout tl	ne course,	students	are requ	ired to su	bmit a lał	oratory	report eac	ch week,	
totaling 14 reports over the duration of the semester.								-				
	Midterm Exam – 20%											
	Final Exam – 50%											
Rubric		Fore	For each report, a rubric will be provided during the first week. The rubric has four main									
sections for grading: aim of the study, materials & methods, results, and discus								d discuss	ion.			
Instruc	tor				-			.		<u> </u>	-	
Name/S	urname	Ozle	m Kaplan		Ema	<u>11</u>		zlem.ka	plan@ala	anya.edu.	tr	
Koom	310 Office Hours Monday 10:30-12:30 and Tuesday 10:30-12:30 10:30-12:30								esday			

Prepared by Özlem Kaplan on November 11th, 2024